Southern Health and Social Care Trust

Southern HSC Trust

Procedures for the Use of Syringe Drivers

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The Trust would like to thank those staff from legacy trusts within the SHSSB who produced the original 2006 *Guidelines for the Use of Syringe Drivers in Palliative Care* and members of the Southern HSC Trust Syringe Driver Procedures Working Group who amended the procedures for wider use within the Trust.

Information from the Graseby® Syringe Driver Manual and pictures of Graseby® syringe drivers are used with the kind permission of Smiths Medical. Every effort has been made to ensure that the information contained in this document is correct at the time of publication. However, users must always check that the information and procedures concur with the most up to date published product information, data sheets provided by the manufacturers and the most recent safety regulations.

1.0 INTRODUCTION

This document sets out procedures for the safe use of Graseby® syringe drivers within the Southern Health and Social Care Trust (SHSCT). The procedures should be followed by all registered nurses, midwives and doctors employed by the Southern Trust working in hospital, community or other care settings.

These procedures have been developed to support the clinical governance agenda and ensure patient safety and continuing service improvement.

There are several conditions in which a syringe driver may be used; the main one being for use is for symptom management in palliative and terminal care via continuous subcutaneous infusion and for administration of small volume infusions in neonatal patients.

The **Graseby MS26®** is the only syringe driver to be used in the care of **adult** patients in the SHSCT.

The **Graseby MS16A®** is the only syringe driver used in the care of **neonates** within the SHSCT.

The **Graseby MS26®** is in the only syringe driver used in the palliative care of **children in the community** within the SHSCT.

Neither the **Graseby MS16A®** nor the **Graseby MS26®** [e] are used in the **acute childrens's** ward

If an adult patient is transferred into the Trust with a different syringe driver, it must be changed to a **Graseby MS26®** as soon as possible and the alternative syringe driver quarantined until it can be returned to its owner.

A copy of these procedures can be downloaded from the Southern HSC Trust intranet website. Follow the links from Home Page – Policy and Procedures – Governance – Nursing and Midwifery.

For further information on these procedures please contact the Assistant Director Nursing Governance on 02838 38833348 or fiona.wright@southerntrust.hscni.net

1.1 Definition of a Syringe Driver

A syringe driver is a small battery powered medical device for pushing the plunger of a syringe forward to deliver parenteral medication and fluids at an accurately pre-determined rate.

The Graseby® MS26 syringe driver may be discreetly worn by patients while they are undergoing treatment, enabling them to continue with normal activities.

Fig. 1 Summary of the main differences between the Graseby® MS26 and the Graseby® MS16A syringe drivers

	GRASEBY® MS26 DAILY RATE (24 HOUR) SYRINGE DRIVER	GRASEBY® MS16A HOURLY RATE SYRINGE DRIVER
Colour of syringe driver label	**GREEN**	**BLUE**
Rate range	0-99mm per 24 hours	0-99mm/hour
Boost facility	Yes (Use of the Booster facility is **NOT** recommended)	No
Indicator light frequency	Every 25 seconds	Every 1 second

The MS26 is intended for administrations over periods of 1 day and longer.
The MS16A is intended for administrations lasting between 30 minutes and 24 hours.

Any member of staff using a syringe driver must be trained in its use. He/she should have knowledge of all aspects of its use and, in particular:-

- Awareness of the different types of Graseby® syringe driver and when each is used;
- How to calculate and set the rate for the particular driver being used;
- Monitoring requirements during the period of the infusion;
- How to recognize and deal with any problems that may arise.

Training updates should occur on a regular basis.

1.2 Indications for use of a Syringe Driver

Continuous subcutaneous infusion via a syringe driver is a useful alternative method for administering medication when the oral route is not available or practical for various reasons. It does not replace oral, rectal, transdermal, sublingual or buccal administration but is available should the first line routes of administration become impractical or impossible.

Syringe drivers are suitable for delivery of subcutaneous medication, and in adults or children with life limiting illness, are most widely used to provide symptom relief in palliative care. Such use of a syringe driver does not always indicate that the end of a patient's life is approaching.

A combination of medicines in the syringe driver may be used to manage more than one symptom by continuous subcutaneous infusion (CSCI), thus eliminating the 'peak and trough' effect of intermittent dosing and avoiding the need for repeated injections.

CSCI should be considered in the following situations: -

- When a patient cannot tolerate oral therapy due to uncontrolled nausea, vomiting or dysphagia
- When a patient is comatose, too drowsy or too weak to take oral medication
- When a patient has gastrointestinal (GI) obstruction or malabsorption
- When a patient experiences intractable pain not well controlled by oral medication
- When the sublingual, buccal, transdermal or rectal routes are inappropriate
- When a patient experiences adverse effects related to high peak levels soon after drug administration (e.g. drowsiness, nausea, hallucination).

A syringe driver may be used to deliver a small volume infusion in paediatric or neonatal care.

NB. A syringe driver must be removed if a patient is having an MRI scan

1.3 Advantages of Syringe Driver use

- Continuous release of medication over 24 hours gives a steady plasma drug concentration
- Sustained symptom control
- Medication can be administered if impaired GI absorption is suspected
- More than one drug can be given at the same time
- Patient comfort - fewer subcutaneous injections or the need to take medicine orally
- Mobility and independence can be maintained.

1.4 Preparation of Patient and Relatives for use of a Syringe Driver

The patient and/or relatives should contribute to the decision to use a syringe driver. He/she should be made aware of the indications for its use, remembering that it may interpreted as confirmation of deterioration rather than as a way to control symptoms. The patient and/or relatives should be given sufficient guidance, supported with written information, about syringe driver use before a decision is made.

When a syringe driver is commenced, the Southern HSC Trust Information leaflet on syringe drivers should be given to each patient or their carer.

Patients in the community must be given emergency contact names and telephone numbers in case of problems with their syringe driver or symptom management.

2.0 SETTING UP AND MONITORING AN INFUSION VIA SYRINGE DRIVER

These procedures should be used in conjunction with the instruction manual for Graseby Syringe Drivers.

2.1 Items required to set up an Infusion via Syringe Driver

- MS26® syringe driver
- Alkaline 9-volt battery
- Appropriate size Luer lock syringe (see page 11)
- Sterile needle(s) +/- extra syringe(s) to draw up drug(s)
- Infusion set and cannula
- Transparent dressing
- Alcohol wipe
- Prescribed medicines and diluents
- Prescription/syringe driver monitoring chart

- 'Drug infusion via syringe' label for syringe
- Rate adjuster key, paperclip or flat blade screwdriver
- Ruler with millimeter scale
- Lock box and key

2.2 Batteries

A 9-volt alkaline battery identified by the international code 6LR61 must be used. The Duracell® MN1604A is a recommended battery of this type. Ensure that the brand of battery used fits securely without forcing into the battery compartment.

- A fresh battery should last for 50 complete infusions
- An alarm will sound for about 15 seconds when the battery is inserted correctly
- The indicator light will flash, indicating there is sufficient power left in the battery to complete the infusion. **If this light stops flashing while the syringe driver is running, the infusion will still continue for 24 hours. The battery should then be replaced before any subsequent infusion**
- When a syringe driver is used in the community, a spare 9 volt battery and instructions how to insert it into the syringe driver should be left with the patient in case of emergency
- Remove the battery when the syringe driver is not in use.

2.3 Luer Lock Syringe

A syringe with a luer lock nozzle must be used in a syringe driver. If an ordinary luer tip syringe is used, pressure can build up in the tubing when the driver is functioning and may cause separation of the line from the syringe.

Luer lock syringes offer more security against accidental disconnection of the infusion line.

Size of Syringe
The size of the syringe used will depend on the final volume needed for solution of the drugs in the syringe driver. Various brands and sizes of syringe can be used with the Graseby MS16A® and MS26® syringe drivers. This is because the measurement of infusion rate is determined by **millimetres of travel of the plunger (length)** and not in millilitres (volume). As the maximum **length of fluid** which can be administered is 60 millimetres, larger sizes of syringe may not be filled to full capacity. The SHSCT are currently using BD Plastipak® syringes and for this brand of syringe the following volumes apply;

If final volume is - up to 9ml, use a 10ml luer lock syringe
- up to 16ml, use a 20ml luer lock syringe
- up to 21 ml, use a 30ml luer lock syringe

A lock box must be used with a 30ml syringe to protect the syringe tip / infusion line connection.

A syringe larger than 30ml will not fit into the lock box.

2.4 Infusion Sets

The infusion set used with the syringe driver should have a butterfly needle or a cannula attached to an extension line.

The following sets are suitable for use and may be ordered from stores.

- Microflex® (PVC) infusion set (REF: 246.100) manufactured by Vygon. This has a 25G needle and 100cm extension tube.

- Sims Graseby Flo-Safer® infusion set with orange butterfly needle and 100cm extension tube.

- Sof-set® Infusion device (MMT-111) with 107cm extension tube, manufactured by MiniMed. **This set should be used if a patient has a nickel allergy or is unable to tolerate the other infusion sets**.

2.5 Preparing the Syringe and Infusion Set

- Assemble medicines for administration as per prescription chart
- Calculate total volume of medicines and diluent required and select appropriate size syringe
- Draw up required medicines and diluent to the specified volume into the syringe.

2.6 Measuring the length of fluid in the Syringe

- The scale on the front of the syringe driver may be used to measure the length of fluid in the syringe prior to attachment on the syringe driver
- A ruler with millimetre scale should be used to measure the length of fluid in the syringe during an infusion. If a ruler is not available, the syringe may be removed to measure fluid length against the scale on the front of the syringe driver
- The syringe driver and syringe should be removed from a lock box in order to check the length of fluid in the syringe.
- Care must be taken to ensure the syringe is securely and correctly repositioned on the driver and re-inserted into the lock box, if it has been moved during the measuring process
- Measure the fluid length in the syringe barrel **in millimetres** from the zero line on the syringe scale to the line at the end of the plunger piston, see Fig 2. Measuring the fluid length against the scale on the syringe driver is shown in Fig 3.

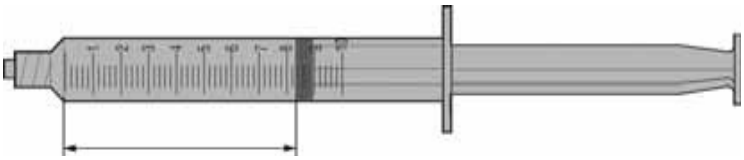

Fig 2. Measure the fluid length in the syringe barrel

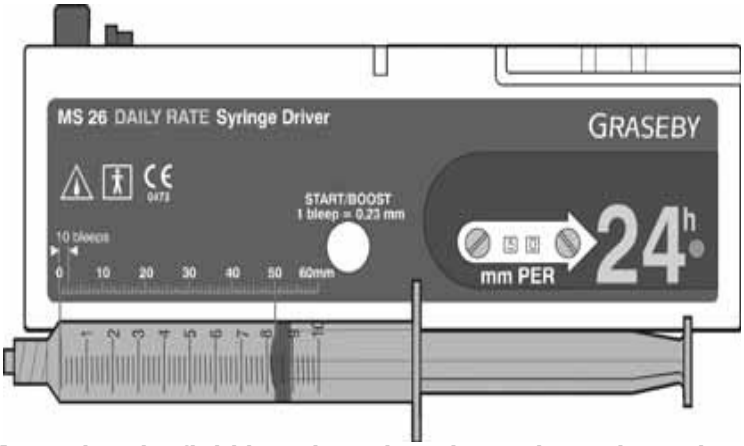

Fig 3. Measuring the fluid length against the scale on the syringe driver

2.7 Labelling the barrel of the Syringe

After the medicines have been drawn up into the syringe, the barrel of the syringe should be labelled using one of the labels entitled **Medicines in syringe for injection / infusion**. These labels may be ordered from Regional Supplies Service (RSS). **The RSS order code is WRN2501.**

Complete all sections of the label and attach it to the barrel of the syringe so that it: -

- Does not obscure the volume measures
- Leaves the solution visible from above when the syringe is situated in the driver
- Does not inhibit the action of the plunger on the syringe.

2.8 Priming the Line – 'Prime then measure'

- Fill the syringe with the prescribed volume of medication
- Connect the administration set to the syringe and slowly depress the plunger to fill the line until a drop of fluid appears at the end of the butterfly needle, ensuring that there are no air bubbles
- Measure the length of fluid in the syringe in millimetres (mm) from the zero line on the syringe scale up to the line where the plunger piston is
- Calculate the rate according to which syringe driver is being used and set the rate in the rate windows on the front of the syringe driver.

2.9 Fitting the Syringe on to the Syringe Driver

- Place the syringe on top of the driver with the barrel in the recess. The finger grip on the syringe must be in the slot that is visible from the front of the driver
- Pull the neoprene strap firmly over the syringe barrel and hook it into the groove on the side of the driver
- Move the actuator up to the syringe plunger by pressing and holding the white button on the side and sliding it along. Fit the push-button on the plunger of the syringe into the slot on the actuator, taking care not to push the plunger forward.

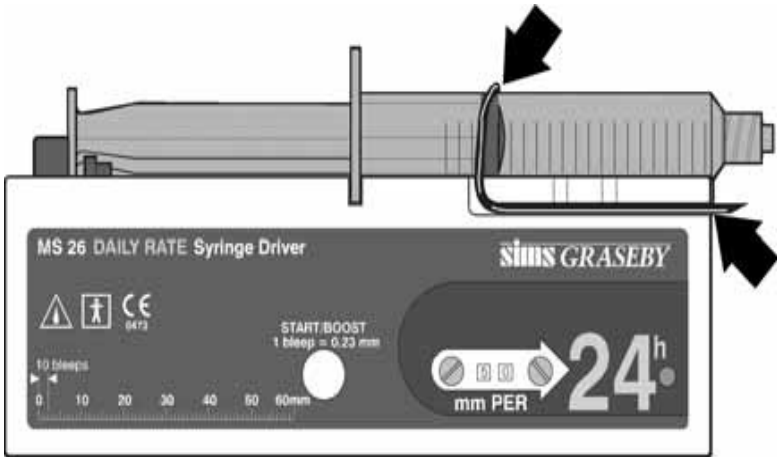

Fig. 4 Position of syringe on the driver

2.10 Setting the Infusion Rate

The rate at which a syringe driver is set at depends on: -

- **The type of syringe driver being used**
- **The length of solution in the syringe driver**
- **The total infusion period.**

For the Graseby MS26 Daily Rate syringe driver: -
Set the rate on the front of the syringe driver by using the rate adjuster key, screwdriver or paper clip but not a sharp implement such as scissors as this could cause damage. The rate switch must be moved until all of the number is seen clearly in the window. The rate will read as millimetres per 24 hours in the window at the front of the syringe driver.

For the Graseby MS16 hourly rate syringe driver: -
Set the rate on the front of the syringe driver as above. The rate will read as millimetres per hour.

The rate must be checked and re-set every time an infusion is commenced.

✓	✓	✓	✗
Rate adjuster key	Paper clip	Graseby rate adjuster/ Measuring key ring	Scissors

Do not change the rate setting of the syringe driver during the period of infusion

2.11 Calculation of Infusion Rate for the Graseby MS26® (24 Hour Syringe Driver)

The Graseby MS26® syringe driver runs at millimetres PER 24 HOURS

- Measure the length of solution in the syringe in millimetres, from the zero line on the syringe scale to the base of the plunger piston
- Divide this length in millimetres by the number of days in which all the medication in the syringe needs to be administered

- Set the rate of infusion as the length **in millimetres per 24 hours**.

e.g. **Length of fluid in millimetres = 55mm**
Infusion time in days = 1

Rate = 55mm/24hours

2.12 Calculation of Infusion Rate for the Graseby MS16A® (Hourly Rate Syringe Driver)

The Graseby MS16A® syringe driver runs at millimetres PER HOUR

- Measure the length of solution in the syringe in millimetres, from the zero line on the syringe scale to the base of the plunger piston
- Divide this length in millimetres by the number of hours in which all the medication in the syringe needs to be administered
- Set the rate of infusion as the length **in millimetres per hour.**

e.g. Length of fluid in millimetres = 26 mm = 13, Rate is set 13mm per hour
Infusion time in hours 2 hours

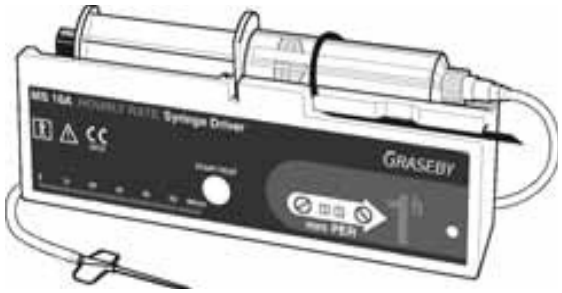

Fig. 5 Graseby MS16A® hourly rate syringe driver (Blue label)

2.13 Insertion of the Needle or Cannula

Insertion of the needle into the patient should be made as comfortable as possible. If the syringe driver is being used on a child or a person who finds needle insertion painful, local anaesthetic cream may be prescribed and applied to the area before inserting the cannula.

The procedure for inserting the cannula is as follows:

- Choose an appropriate subcutaneous site and swab area with an alcohol wipe (see Choice of Infusion site on page 13
- Insert a 25 gauge needle into the skin at an angle of 45 degrees ensuring the bore of the needle is facing downwards and lay it flat against the skin. Lifting a fold of skin between the thumb and finger may ease insertion. Do NOT bend the needle
- Loop part of the tubing over the wing of the infusion set, so that the wing, not the needle, absorbs any tension
- Tape the infusion wings firmly to the skin using a transparent occlusive dressing such as Tegaderm® or Bioclusiv®.

2.14 Using a Sof-set® Infusion Set

A Sof-set® infusion set may be used if a site becomes irritated due to nickel allergy.

- Securely attach the luer-lock syringe to the Sof-set® and prime the infusion set;
- Confirm that the set is completely primed by observing that the medication drips

from the needle of the Sof-set®. Do not leave large air bubbles in either the syringe or the infusion set as this could reduce medication delivery;
• Insert the filled syringe into the syringe driver.
See separate Sof-set® manufacturer's instruction sheet.

It is vital that the following steps are observed when inserting a Sof-set® Infusion set:
1. Prime the line
2. Insert needle as per instructions
3. Secure the Sof-set® with the tape provided
4. Remove the introducer needle.

2.15 Starting the Infusion by Syringe Driver

- Insert a battery into the battery compartment. Replace the battery cover and wait for the alarm to sound
- Press on the start/boost button for 10 seconds on the MS26® or 5 seconds on the MS16A®
- The motor will run for several seconds and then stop. Release the button and the syringe driver will now run
- The indicator light will start to flash
- DO NOT proceed if: -
    - The syringe driver motor does not stop
    - The alarm does not sound
    - The light does not flash.

Remove a faulty syringe driver from use and quarantine until it has been checked.

- Record the time that the infusion commences on the prescription chart.

Do not use mobile phones closer than 1 metre to a syringe driver

2.16 Stopping the Syringe Driver

There is no STOP or OFF switch on the syringe driver to stop the infusion.

- The syringe driver will automatically switch off when the syringe has been emptied and an alarm will sound for approximately 15 seconds.
- To stop the infusion for any other reason, remove the battery and set the rate to zero.

2.17 Using a Lock Box or Cover

A lock box should be used to reduce risk and promote safety in use of a syringe driver. It is the policy within the Southern Trust that lock boxes are used routinely to ensure integrity of syringe contents and syringe driver system.

In exceptional circumstances, if a lock box is not used, e.g., a patient in the community does not wish to have one, then the district nurse must undertake a local individual risk assessment in conjunction with the patient and decide whether or not to use a smaller plastic cover instead. This decision should be documented in the patient's notes.

A lock box must be used when a 30ml syringe is required in order to protect the syringe tip / cannula connection which protrudes over the edge of the driver.

When a lock box is used in the community, a key must be left with the syringe driver

equipment pack in order to allow access to the syringe driver by all healthcare professionals visiting that patient.

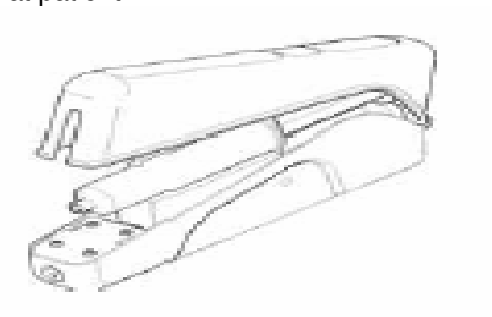

Fig. 6 A Lock-box

To fit the lock box fit the driver securely into the bottom of the lock box and check that the infusion line is not trapped when the box is locked.

- When a patient is discharged with a syringe driver from hospital to community, the lock box should remain locked

- A 30ml luer-lock syringe is the maximum size of syringe that will fit into a lock box and the finger grip on the syringe needs to be in a vertical rather than horizontal alignment.

Using a Cover

An open-ended cover is supplied with each syringe driver to protect the syringe and pump during operation. To fit the cover, slide the syringe driver into one of the open ends of the cover, ensuring the front faces the side of the cover with the hole in it, leaving the start/boost button exposed.

If the cover is put on the wrong way round the position of the protrusion at the back of the cover coincides with the position of the start/boost button on the front of the driver and may cause the syringe contents to be delivered over a short period of time because the boost button is continually pressed.

Always ensure that a syringe driver is placed correctly into the cover

2.18 Choice of Infusion Site

The preferred sites to insert a subcutaneous cannula are:
- Abdominal wall
- Anterior aspect of thighs
- Upper chest wall (use with care in a cachetic patient)
- Anterior aspect of upper arm.

The anterior aspects of the limbs should be used rather than the lateral aspect, as this avoids pressure on the cannula site if the patient lies on his/her side or turns over in bed. A site on the upper body is more suitable if the patient is likely to carry the syringe driver about. The upper back (scapula region) can be used if the patient is confused as this reduces the risk of the cannula being pulled out. If possible ask the patient which site he/she prefers.

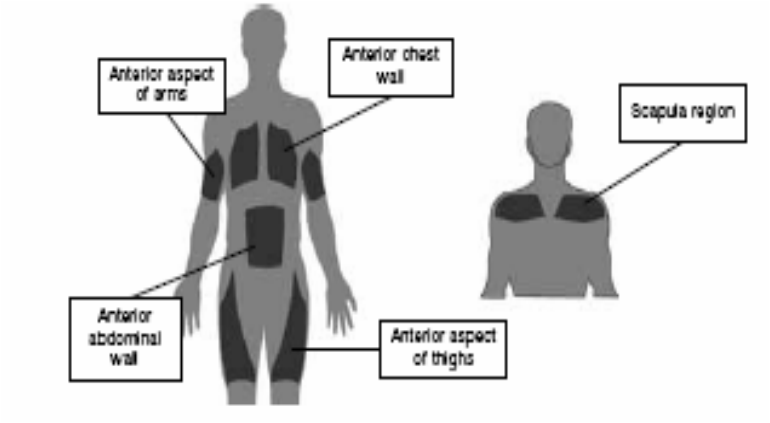

Fig. 7 Suitable sites for subcutaneous infusion

Areas to avoid when siting an infusion cannula: -

- Any lymphoedematous area, because absorption is affected
- Any area of damaged skin: scar tissue, bruised or broken skin, reddened area, pressure area where skin perfusion is affected or skin folds
- Recently irradiated skin
- The upper arm site in patients who are confined to bed and who require turning at regular intervals
- Any site near to a joint or over a bony prominence
- The abdomen, if abdominal ascites is present
- A limb with Peripheral Inserted Central Catheter (PICC) lines or chemotherapy infusions.

2.19 Re-siting the Infusion Cannula

- A new administration set must be used each time the infusion is re-sited
- The site must be checked regularly for signs of induration, redness, pain or inflammation and changed if these are present
- In the community, the syringe driver and infusion site should be checked at each nurse/ doctor visit to a patient and observations recorded on the prescription chart
- In hospital or hospice the syringe driver and infusion site must be checked at least four hourly and observations recorded on the prescription chart
- Ensure a new site is located at least 3cm from a previous site and rotated round different limbs/body areas at each change.

2.20 Monitoring the Infusion

It is important to monitor the syringe driver regularly during an infusion period. The syringe driver prescription and administration record chart has been devised to meet current recommendations for record keeping of infusion systems.

In hospital/hospice, the infusion should be checked in the first 30 minutes after set-up and then every 4 hours. The observations must be recorded on the 'Syringe Driver Prescription/ Administration Record'.

In the community, the syringe driver should be checked every time a nurse visits the patient.

Family members may be trained to undertake basic checks between nursing visits and if they notice any problems are advised to inform the district nurse.

2.21 Monitoring the Infusion - Checking mechanisms

Syringe driver checks

- Ensure tubing is securely connected and not leaking fluid
- Ensure syringe driver light is flashing: MS26® – every 25 seconds.
  MS16A® – every second.

This indicates the battery is secure and the motor is working.

Syringe checks

- Check that the solution in the syringe is clear. If there is any sign of crystallisation or precipitation, discontinue the infusion and check compatibility of the drug and diluent combination
- Measure the length of solution left in syringe
- Calculate the length of solution administered since last check
- Confirm that the driver is running to time by calculating that the length of solution remaining in the syringe is what you would expect it to be. If there is a discrepancy between actual and expected length, investigate what has caused it and take action to correct the fault.

Needle insertion site

- Check that the needle has not been dislodged
- Look for redness, irritation, swelling or oedema, bruising or pain
- Check that there is no sign of backflow in the tubing or leakage of fluid under the transparent dressing and that the dressing is secure.

Record and sign all the checks on the administration record each time they are carried out. Document any problems.

- If a problem is identified during the checking procedure the infusion should be stopped and the problem resolved
- If the problem is at the infusion site the needle should be re-sited using a new infusion set
- If the problem is with the drugs in the syringe contact the prescriber for a change in prescription and prepare a new syringe and set up the infusion again
- If the problem is with the syringe driver use a new syringe driver and/or new batteries.

2.22 Boosting the Syringe Driver Infusion

THE BOOST FACILITY ON A SYRINGE DRIVER SHOULD NOT BE USED

- As all drugs in the syringe will be boosted as well as the required drug giving rise to increased risk of side effects
- Boosting the syringe driver can cause pain and irritation at the injection site
- The infusion will finish before its due time. Each boost reduces the overall infusion time by approximately 30 minutes in a 24-hour infusion
- Use of the boost button is not recorded on the administration record
- The small dose administered is insufficient to alleviate symptoms
- Use of the boost facility or the request to use it should be a sign that the prescription needs to be amended
- Appropriate doses of 'when required' medication should always be co-prescribed with a syringe driver.

2.23 Changing the Prescription

If the prescription for drugs in the syringe driver needs to be changed the original syringe and contents should be discarded safely according to local waste regulations and a new syringe drawn up to replace it.

DO NOT ADD EXTRA DRUGS TO A SYRINGE DRIVER DURING ITS PERIOD OF INFUSION

It will take several hours for an increased drug dose to have a therapeutic effect. Appropriate breakthrough doses should be prescribed to be given subcutaneously or orally to manage the patient's symptoms until the new drug levels are attained.

If a community nurse is at a patient's home and feels that the prescription should be amended to alleviate changing symptoms, the Nursing and Midwifery Council guidance, Standard 11 in Standards for Medicines Management (August 2008) should be adhered to.

Administering medication from a remote prescription/direction to administer

In exceptional circumstances where a medication (NOT including Controlled Drugs) has been previously prescribed and the prescriber is unable to issue a new prescription, but where changes to the dose are considered necessary, the use of information technology (such as fax, text message or email) must be used to confirm any change to the original prescription.

A verbal order is not acceptable on its own. The fax or email prescription/ direction to administer must be stapled to the patient's existing medication chart. This should be followed up by a new prescription signed by the prescriber who sent the fax/email confirming the changes within normally a maximum of 24 hours Monday to Friday (72 hours maximum – Bank Holidays and weekends). In any event, the changes must have been authorised (via text, email or fax) by a registered prescriber before the new dosage is administered. The registered nurse should request the prescriber to confirm and sign changes on the patient's individual medicines administration record chart or care plan.

Where a medication has not been prescribed before, a nurse or midwife independent prescriber may not prescribe remotely if s/he has not assessed the patient except in life threatening situations.

In exceptional circumstances

In exceptional circumstances a medical practitioner may need to prescribe remotely for a previously unprescribed medicine e.g., in palliative care or remote and rural areas. In this situation the use of information technology (such as fax, text message or email) must confirm the prescription before it is administered. This should be followed up by a new prescription signed by the prescriber who sent the fax/email confirming the changes within normally a maximum of 24 hours Monday to Friday (72 hours maximum – Bank Holidays and weekends). The registrant is accountable for ensuring all relevant information has been communicated to the prescriber and s/he may refuse to accept a remote prescription if it compromises care to the patient. In this instance she should document accurately the communication that has taken place.

NB. A prescription is required when the drug is to be both supplied and administered. For administration only, a direction to administer is sufficient.

A practitioner should be guided by the following: -

- Current practice for registered community nurses is that instructions by telephone from a doctor to a nurse regarding a change in dose of medication must be printed by the nurse on the patient's nursing notes and read back to the doctor for clarity

- The nurse must have access to a recent BNF to check the dose at that time. She/he must be satisfied that the dose change is acceptable and in accordance with the patient's condition
- In hospital, telephoned instructions are not acceptable and alterations must be made to the prescription and signed by a doctor before any change is made to the syringe driver
- PRN and breakthrough medication should be prescribed to reduce the need for urgent prescriptions at times when medical staff are not available.

Registered Practitioners must ensure that they are fully aware of the most recent regulations.

2.24 Changing from a Subcutaneous Infusion to Oral Medication

A subcutaneous infusion can be discontinued if the original indications for using it resolve, in which case: -

- Ensure the patient understands why the infusion is being discontinued and why the oral route is being re-established if applicable
- Ensure subcutaneous drugs are not discontinued before oral medications have had time to establish therapeutic levels
- Adhere to the regimen for the oral route as prescribed by the GP or medical practitioner
- Stop the syringe driver and observe the patient carefully to ensure symptoms remain well controlled by oral drugs.

2.25 Availability of Medication in the Community

The need for setting up a syringe driver can often be anticipated as a patient's condition changes. When possible the prescription should be obtained during normal working hours so that twilight and out of hours services have ready access to the medication if it is required outside normal working hours. The following flow chart directs medical and nursing staff to the possible source of medicines at different time periods throughout the day.

FLOW CHART FOR ACCESSING SYRINGE DRIVERS OUT OF HOURS

During normal working hours →	Patient's own GP should ensure patient has sufficient medication to deal with current and shortly anticipated symptoms. If the patient is on high dose opioids there should be sufficient supply to deal with escalating needs for 18 hour period.
Early Out-of-Hours, rota pharmacy open and Twilight Nursing Service available →	If patient contacts out of hours doctor a prescription may be issued for medicines to manage the core symptoms as per prescribing guidance and the care of the dying pathway. A syringe driver could be prescribed if twilight district nurses are available to set one up and the rota pharmacy has the appropriate medicine in stock. The out of hours doctor should contact the rota pharmacy to ensure it has the prescribed medicine in stock. A syringe driver will take a number of hours to take effect, so if a patient is experiencing severe symptoms, appropriate stat doses should be prescribed and administered.
Rota pharmacy closed but Shopping Centre pharmacy still open →	Some pharmacies in shopping centres may be able to supply the required presciption at this time.
All pharmacies closed. Twilight Nursing Service available →	A syringe driver may be prescribed if a Twilight Nurse is available to set up a syringe driver. If the patient does not have the required drug(s) he should be supplied from the out of hours centre (except opioids). The opioid should be supplied from the doctor's stock.

Normally the family/carer should arrange for collection of the patient's prescription from their community pharmacy. However, in exceptional circumstances the district nurse may be designated as a 'messenger' and may collect the prescription, provided he/she ensures that the drugs are secure and not left unattended until they are brought to the patient's home. This needs to be carried out in accordance with local policy and procedures.

For collection of controlled drugs, legislation effective from the 7th July 2006 states:- *'If the person collecting the Schedule 2CD is a health care professional, the pharmacist must obtain the name and address of the health care professional and, unless they are already acquainted with that person, they must request evidence of that person's identity.'*

Within the Southern HSC Trust area there is a network of nine community palliative care pharmacists. They have training in palliative care issues and hold a wider than normal range of medicines used in palliative medicine. Patients should always be encouraged to attend their regular pharmacy for their medication but may be able to use a network pharmacy in emergency situations.

2.26 Disposal of Medication and Needles

Registered practitioners should refer to local Waste Disposal policies. Syringes, needles and unused portions of drugs must be disposed of safely in line with current legislation and local waste management policies must be adhered to.

In hospital: -
- An empty syringe, tubing and needle must all be discarded into a sharps box
- If there is any drug solution left in the syringe and/or tubing it must be put into a burn bin
- If there is any controlled drug in the residue, disposal must be witnessed as it is discarded into the sluice and both persons involved should sign the 'amount destroyed' section on the prescription sheet.

In the community: -
- Unused excess medicines, syringes or needles should be returned to the community pharmacist who supplied them, for safe disposal
- The syringe driver should be returned to the health centre as soon as possible after it is no longer required.

2.27 Purchasing a new Syringe Driver

Syringe drivers are defined as medical devices and the procedures for purchasing new equipment and devices in 'Management of Equipment and Medical Devices – Operational Procedures Manual' should be followed. This information can be found on the Estates section of the Trust Intranet.

3.0 CARE AND MAINTENANCE OF SYRINGE DRIVERS

3.1 Service and Maintenance Records

The owner of a syringe driver is responsible for ensuring that arrangements are in place to comply with any recommendations governing the use of medical devices. In hospital this responsibility falls to the ward manager.

Responsibilities include: -

- Documentation: full records must be kept detailing all the activities and inputs

relating to each syringe driver, including loans to other wards or users;
- Compliance with cleaning and decontamination procedures between each use
- Ensuring an annual check and regular maintenance and repair is performed.

All syringe drivers **MUST** be maintained in accordance with the manufacturer's recommendations.

Graseby recommend that syringe drivers are checked annually.

- If a syringe driver has been damaged by dropping it or by immersion in water it must be checked before it is used again
- The owner of each syringe driver is responsible for ensuring that it is kept in good working order
- Each syringe driver should be assigned a unique identification code and a use and service record kept
- If a patient is using a syringe driver over a long period of time, it is important to ensure that the annual service is not overlooked for that piece of equipment
- When a syringe driver is submitted for servicing, it must be in a clean decontaminated condition, so that maintenance staff are not subjected to unnecessary risk from contaminated equipment
- Decontamination must be carried out in accordance with the manufacturer's instructions and local infection control policies.

3.2 Cleaning the Syringe Driver

- Clean the syringe driver by wiping it with a soft damp cloth. (Mild detergent or disinfectant may be used if necessary)
- Allow it to dry thoroughly before use
- A small soft brush (toothbrush) is ideal for removing any dirt from the threads of the screw along which the actuator moves
- Do not use strong abrasive cleaning agents, organic solvents or strong disinfectant solutions.

DO NOT:
- Stick surgical or adhesive tape to the syringe driver
- Drop the syringe driver
- Immerse it in water.

Remove a syringe driver from use immediately if:
- It does not perform as expected
- It is dropped or is damaged in any way
- It gets wet.

Mark the syringe driver clearly as quarantined and preferably take it out of the working area altogether so that it cannot accidentally be used until it has been checked. Before it is used again it must be carefully inspected for damage inside and its performance checked to the specification. An accredited, trained technician who is familiar with these devices must carry out the check.

3.3 Storing the Syringe Driver

- Syringe drivers should be stored in a safe dry place;
- The battery should be removed when it is not in use;
- A separate area should be provided for syringe drivers needing cleaning/decontamination and/or repair from those that are ready for use.

3.4 Troubleshooting Problems which may arise during operation of a Syringe Driver

Fig. 9 Table summarizing problems

Problem	Possible Cause	Action
The syringe driver will not start	The START button has not been pressed in enough.	Press start button again.
	There is no battery.	Insert a battery.
	The battery is in the wrong way round.	Insert battery correctly.
	The battery is flat.	Insert a new battery.
The syringe driver does not function at the correct rate	The syringe driver is faulty.	Use a new syringe driver and service faulty one.
	Wrong rate set.	Reset rate.
	Wrong syringe type or size.	Fit correct luer lock syringe.
	Syringe plunger push-button or finger grips were not held in the actuator or case correctly.	Re-adjust syringe position.
	Syringe driver is wet or has been dropped.	**Remove from use immediately and use another syringe driver.**
Infusion is going too quickly	MS16A® being used but the rate was calculated for an MS26®.	Recalculate and set correct rate for syringe driver.
	Boost button on MS26® has been used.	Refrain from using boost button.
The infusion is going too slowly	Battery is exhausted.	Refit a new battery.
	Plunger position measured wrongly.	Re-measure fluid in syringe and reset rate.
The syringe driver has stopped before emptying the syringe	Blocked infusion line.	Check drugs in syringe have not precipitated. Review prescription and replace infusion line.
		Check infusion line is not kinked or trapped in the lock box.
	Actuator or syringe plunger jammed.	Change the syringe or actuator.

4.0 TRAINING OF SYRINGE DRIVER OPERATORS

4.1 Syringe Driver Training Programme

User training is a key element in the safe and efficient use of syringe drivers.

Failure to train staff in the use of syringe drivers contributes greatly to an increased element of risk.

Resources and time must be allocated for training in order to:
- Ensure patient and staff safety
- Minimise adverse incidents
- Avoid damage to the syringe driver through misuse.

Only persons who have received training in the use of syringe drivers should set up a subcutaneous infusion using a syringe driver and monitor the infusion.

This training should be updated regularly according to local policies.

- If more than a year has lapsed since training and regular use of a syringe driver, staff should receive an update in syringe driver use
- Those who are setting up syringe drivers regularly should have an update in syringe driver use every two years
- Any person who has been involved in an adverse incident with syringe driver use should receive an update.

Managers should keep records of any syringe driver training that their staff receive.

Training in syringe driver use may be provided by:
- In-service training/study sessions arranged by the Beeches Management Centre
- Syringe driver training sessions arranged by Palliative Care Teams or Macmillan Nurse Specialists within the Southern Health and Social Care Trust
- 'On-the-job' training from an experienced mentor, with certified competency in syringe driver use training.

Trainers should ensure trainees are competent: -
- To set up a syringe driver
- To monitor the infusion
- To deal with any problems that may arise with the medicines being infused and the working of the syringe driver.

Staff should not be involved in setting up a syringe driver unless they are competent and feel confident to do so.

Doctors, nurses, other healthcare professionals, health care support staff and carers should receive training in syringe driver use, pertinent to their level of knowledge and sphere of activity.

A syringe driver training programme should: -

- Be delivered by a person who has been trained as a trainer and is recognised as competent to do so
- Address all issues relevant to the setting up, operation, checking and maintenance of the device.

A training programme should include the following elements so that a trained, competent user is familiar with the following aspects of the driver:-

- Why the driver is used
- When it is appropriate to use a syringe driver
- How the driver operates
- How to set up a driver
- What syringes and infusion lines to use
- Safety features and alarm features
- How to recognise likely causes of failure to operate
- Common mistakes in the operation of the driver
- How to consult the user manual
- What to do when in difficulty
- How to identify adverse incidents
- How to deal with adverse incidents.

Medical and nursing staff should also be aware of the following aspects:
- Drugs and appropriate dosages used in syringe driver
- Recognition of incompatibility
- Injection site monitoring
- Sources of information on syringe driver use.

4.2 Educating Patients and Carers

Any patient requiring a syringe driver or their carer(s) should be given a verbal explanation of the following:-

- Reasons for using the route
- Care of the syringe driver
- Checks which she/he can carry out
- What to do if the alarm sounds
- Whom to contact if a problem develops at home
- The need to avoid mobile phones in the vicinity of a syringe driver
- Advice on bathing or showering whilst using the syringe driver.

They should also be given an information sheet or booklet which covers all of the above.

In addition the patient should be supplied with or advised on an appropriate and comfortable means of carrying the syringe driver.

4.3 Adverse Incidents

An adverse incident is defined as ‘an event which gives rise to, or has the potential to produce unexpected or unwanted effects involving the safety of patients, staff, users or others.’

Every Health and Social Care employee has a duty to see that all safety related incidents are reported. If adverse incidents are reported and if the chain of events leading up to and contributing to an adverse event is analysed, it allows individuals and the organisation involved to identify what went wrong. It is then possible to learn from the incident and develop strategies to prevent the same thing happening again.

All adverse incidents involving syringe drivers should be reported and investigated, following local policies for adverse incident reporting.

5.0 REFERENCES

1. DHSSPS .Management of infusion systems.

2. Device Bulletin 99/04 (Northern Ireland) July1999: Medical Device and Equipment Management for Hospital and Community based organisations.

3. CAHGT. Management of Equipment and Medical Devices: Operational Procedures Manual, 2006.

4. Graseby Syringe Driver Instruction Manual, 2002.

5. NMC Guidelines for the Administration of Medicines, 2008.

6.0 APPENDICES

Guidance on recording on the new prescription chart for subcutaneous infusion is being developed and a sample syringe driver prescription chart will be included in this guidance document once agreed.